UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
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JUN 13 2005

Ref: 8ENF-L

SENT VIA REGULAR MAIL

Mr. Glenn Rodgers, Chairman
Shivwits Band of the Paiute Tribe
P.O. Box 448
Santa Clara, UT 84765

Re: Results of Hecla and OMG Site Visit of May 16 -17, 2005

Dear Chairman Rodgers:

Enclosed for the Shivwits Band's information is a report prepared on behalf of the United States Environmental Protection Agency ("EPA") by EPA Geohydrologist Randall W. Breeden, following Mr. Breeden's site visit to the former OMG facility, and the Hecla Mining Company Apex Site Pond 2 (a/k/a "Hecla Pond"), May 16-17, 2005. The report summarizes Mr. Breeden's findings and observations based on his site visit. EPA appreciates the assistance from Shivwits Band ("Band") representatives in helping the Agency achieve its travel objectives.

The purpose of the OMG site visit was to evaluate the pond reclamation project performed by OMG as a supplemental environmental project ("SEP") pursuant to the terms of the Consent Agreement with EPA, filed August 1, 2001. Based on its visit of the former OMG facility, EPA approves the SEP Completion Report ("Report") submitted to EPA by OMG on February 17, 2005. The Report, as well as the site visit, confirm that OMG successfully satisfied all requirements associated with its SEP obligation.

EPA visited the Hecla Pond to inspect and evaluate on-going closure activities, and assess the potential for off-site leachate migration via surface water or groundwater. This assessment included an analysis of the surface water drainage/flow characteristics for the watershed associated with the Hecla Pond. As a result of the site visit, EPA is assured that there is no possibility that free liquid from the impoundment could ever reach the Santa Clara River, the

Ivins Reservoir, and the Virgin River. EPA further confirmed that the closure activities do not pose any threat of environmental harm to the Band's land or water resources. To the contrary, EPA observed the site to be in good condition and on-going closure activities subject to good engineering practices. Specific information and observations pertaining to on-going dewatering activities, as well as EPA's assessment of the ability of liquids to migrate off site, are detailed in the attached report.

Please let us know if you have any questions regarding EPA's recent site visit and observations pertaining to the former OMG facility and the Hecla Pond. The persons at EPA who are most knowledgeable about this matter are Randall Breeden, RCRA Corrective Action Program Geohydrologist, at (303) 312-6522, and Amy Swanson, Enforcement Attorney, at (303) 312-6906.

Sincerely,

Eddie A. Sierra

for Carol Rushin
Assistant Regional Administrator
Office of Enforcement, Compliance
and Environmental Justice

enc: Hecla Impoundment Technical Memorandum

cc: Lawrence Snow, Shivwits Band of Paiute Tribe
Lora Tom, Paiute Indian Tribe
Tod Smith, Whiteing & Smith
John Krause, BIA Western Region Office
Mike McNally, OMG Group
Chris Gypton, Hecla Mining Company

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Date: June 7, 2005

SUBJECT: Technical Memorandum for the Site Visit to the Hecla Impoundment (Pond #2) and Inspection of the Supplemental Environmental Project at the OMG Facility, St. George, Utah

FROM: Randall W. Breeden, Geohydrologist
RCRA Corrective Action Technical Support

TO: Amy L. Swanson, Enforcement Attorney
Eric R. Johnson, Project Manager
RCRA Enforcement Program

This Technical Memorandum discusses the results of a site visit to the Hecla and OMG sites near St. George, Utah conducted on May 16 – 17, 2005. The two sites sit adjacent to each other on land leased from the Shivwits Band of the Paiutes located approximately 10 miles northwest of St. George. The purpose of the site visit was three fold. The first objective was to evaluate the progress of completion of the Supplemental Environmental Projects (SEP) at the OMG facility. The second was to inspect and evaluate the progress and activities currently being implemented for the Closure of the Hecla Impoundment (Pond #2) per the EPA approved Closure Plan. The third was to determine the surface water drainage/flow characteristics of the on-site and off-site surface water for the entire sub-watershed of the Santa Clara River in which the Hecla Impoundment is located. All three objectives were accomplished during the site visit. Those present at the Hecla inspection were Chris Gypton from Hecla Mining, and Hecla consultants Doug Gibbs and Dave Jones. The field reconnaissance included Doug Gibbs and Sage Brushhead from the Shivwitz Band of the Paiutes.

Also included is a section addressing the ability of liquids to migrate beyond the unit via surface water and ground water. This section address the concerns raised by BIA's consultant, Ninyo and Moore regarding the ability of liquids from the impoundment to migrate off-site and entering the Santa Clara River, Ivins Reservoir, Virgin River and ground water.

OMG SEP Evaluation

Requirements of the SEP at the OMG facility include removal of all liquids, sediments, liners, and contaminated soil beneath the liners from three closed evaporation ponds. Visual examination of the three closed ponds indicates that the liquids, sediments, and liners have been completely removed from the ponds down to bare, visually clean soil. This site visit did not include the collection and analysis of soil samples from the former ponds. Therefore, determination of whether contaminant concentrations within the former ponds are at or below the required clean up criteria was not confirmed by this visit. However, if prior analytical results indicate that contaminant concentrations are at or below the clean up criteria stipulated in the January 30, 2004 Sampling and Analysis Plan, then closure of these ponds should be considered complete. Pictures 1, 2, 3, and 4, show the current condition of the three former evaporation ponds.

Hecla Impoundment (Pond #2)

Significant progress has been made regarding the installation and operation of the dewatering project for the impoundment. To date, four HDPE lined evaporation ponds, each of which is approximately one half acre in surface area and three feet deep, have been installed on top of the impoundment. The ponds gather and evaporate liquids collected from 17 shallow sumps and 7 deep sumps installed within the pond. The objective of the dewatering project is to remove all free liquids to a minimum of two feet below the top of the original liner. Liquid level in the sumps are monitored daily and if liquid is present, it is pumped out of the sump(s) into one of the evaporation ponds. In addition, liquids that accumulate in the lined impoundments along the seeps on the outside of the impoundment are also pumped into the evaporation ponds. The collection and evaporation of free liquids from within the impoundment will continue until the level of liquid is two feet below the top of the original liner. The exact length of time needed to attain that goal is dependent on several factors, primarily evaporation rates and precipitation amounts. However it is expected to continue throughout the summer. The liquid level in the evaporation ponds is dependent upon how much is liquid enters the sumps. Operations to date indicate that the liquid level in the evaporation ponds can be maintained at approximately one foot in depth, leaving two feet of free board in each evaporation pond. Pictures 5, 6, 7, 8, and 9 show the evaporation ponds.

Once the dewatering project is completed final grading and construction of the cap will proceed. The final grading includes an engineered channel that will be significantly enlarged and armored for run-on and run-off control around the impoundment. For a full description of the channel locations and engineering please refer to the Closure Plan.

At the present, and until the final grading begins, a temporary HDPE liner has been installed around the toe of the outside perimeter of the impoundment, see pictures 10 and 11. This liner is to prevent erosion of the toe of the slope in the event of a high precipitation event. It will be removed when final grading and armoring of the run-off channel is constructed.

The site is completely fenced and has warning signs placed every 100 ft. as well as on the entrance gate. See pictures 12 and 13.

Analysis of Sub-Watershed Characteristics

In order to gain a thorough understanding of the surface water flow patterns, watershed characteristics and channel morphology of the sub-watershed of the Santa Clara River in which the Hecla impoundment is located, a field reconnaissance of the sub-watershed was conducted. The field reconnaissance included hiking, driving along, visual observation, and photographing the drainage of the 1st, 2nd, and 3rd order stream reaches in which the site is located. The 4th order reach was reconnoitered for a distance to within 0.2 miles of the Santa Clara River. The linear distance from the impoundment to the river is approximately 2 miles. Figure 1 shows the sub-watershed containing the Hecla site and surrounding surface water drainage for the Santa Clara River in the vicinity of the Hecla site. The entire 1st order reach and approximately 75% of the linear distance of the 2nd order reach are ephemeral. Geologic structure located approximately 0.6 miles above the Santa Clara River forces ground water to discharge to the surface, thus creating a well defined spring, see Figure 1 and pictures 14, 15, 16 and 17. An estimation of the surface flow, at the time of observation, was approximately 0.1 cfs or less. This flow continues, with no observable increase in ground water discharge all the way to the Santa Clara River and was the only observed flowing water along the entire length of the 2nd – 4th order reaches. No other ground water discharge, or surface water input was observed between the Hecla site and Santa Clara River.

During January 2005 the precipitation in the St. George area was 2.79 inches, 1.66 inches above the average of 1.07 inches, as a result, severe flooding along the Santa Clara River occurred, causing severe damage to several bridges, washing out many roads and causing severe scouring of the river bed. Since January is the wettest month of the year for this part of Utah, and precipitation was more than twice the average, an effort was made to determine if flooding had occurred along the streams on and off the Hecla property. This was done by looking for the normal effects caused by flood conditions: including high-water marks, bank erosion, undercuts, slumping, excessive scouring of the stream bed, and debris outside of the stream channel. This was done in order to determine if the precipitation that caused flooding of the Santa Clara River had also caused flooding of the streams leaving the Hecla site. Visual observations indicated that there was no flooding in the 1st, 2nd and 3rd order reaches of the unnamed streams leaving the Hecla site. There was no observable stream bank erosion or slumping in the areas of highest energy. In addition, there was no observable indication that flow had exceeded the banks by depositing debris outside the stream banks. See pictures 18 - 43. This was an interesting observation given the fact that the Santa Clara River had reached damaging flood levels. However, there is an explanation: the watersheds in vicinity of the Hecla site are at a lower elevation than the many of the other watersheds that flow into the river, and as such they did not have any snow pack when the rains began. The flooding of the Santa Clara River was caused by higher than average precipitation compounded by the rapid melting of the snow pack as the warm rains rapidly melted the snow in the higher elevations to the north and east. Consequently, in an area that had already seen higher than average precipitation from November to January, the areas with a snowpack (such as to the north and east of the Hecla site) melted rapidly enough to produce severe flooding, while the low-elevation small watersheds which had no snowpack either did not flood at all or had only minor flooding.

Ability of Liquids to Migrate to the Santa Clara River and Beyond

In order for free liquid from the Hecla impoundment to flow, via the surface, off-site and reach Santa Clara River it must first over-top the free board of the existing evaporation ponds located on top of the unit, and/or over-top the seep collection impoundments/evaporation ponds located along the southwest side of the impoundment, then flow into, fill, and flow out of, the 4 million gallon run-off collection pond located on the OMG property. If the 4 million gallon collection pond overflows, the run-off must then fill another retention pond located approximately 500 yards downstream, (referred to as the "cow pond", estimated 50,000 gallon capacity), and then continue downstream an additional 1.5 miles to the Santa Clara River. The evaporation ponds have approximately 2 feet of free board, so to exceed that, a precipitation event exceeding 24 inches of rainfall would need to occur. Even if the evaporation ponds have only one foot of free board, a precipitation event of greater than 12 inches must occur in order for over-topping to occur. In addition, the rate of precipitation would have to exceed the rate of evaporation. That is very unlikely to happen given the average annual precipitation for St. George, Utah is 8.8 inches. The wettest month is January and the average total monthly precipitation for January is 1.07 inches. January 2005 saw 2.73 inches (more than twice the average) of precipitation and during that time two evaporation ponds had been constructed and they did not over-top. Discussions with the Hecla Site Manager indicated that there was always sufficient free board to prevent over- topping. Hecla performed ground-visual and aerial reconnaissance of the units during the period of heaviest precipitation in January 2005 in order to validate that no over-topping occurred.

Calculations of the 6 hour and 24 hour, 25 year recurrent interval storm events indicate that 1.9 inches and 2.4 inches of rainfall could occur at the site respectively. Those events are well below the amount necessary to exceed the free board of the evaporation ponds.

The evaporation ponds are temporary and will be removed once the liquid level in the impoundment attains the desired level. Once they are removed, there will no longer be any free liquid available for migration off-site via the surface water drainages. However, if a failure of the liner were to occur, there is a possibility that liquids remaining in the impoundment could migrate into the surrounding soil. So, in order to determine the extent to which liquids could migrate, calculation of the soil's assimilative capacity was conducted. The characteristics of the soil matrix below the base of the unit, but above bedrock, were taken from the geotechnical engineering data collected from the 2001 drilling project around the outside perimeter of the impoundment, (Results of the October 2001 Investigations: Apex Site Pond #2 Soils Sampling and Analysis, December, 2001).

The soil assimilative capacity calculations used very conservative assumptions of the amount of free liquid in remaining the impoundment: 11,000,000 gallons, (which assumes the unit is half liquid, which it is not). It was also assumes that the entire liner will fail all at once, which is very unlikely. The results indicate that under the worst case scenario, with only 5% of the soil pore space available to accept liquid, and a soil depth of 15 feet, the radius of free liquid migration around the impoundment (where the liquid content of the soil in no longer above Field Capacity, or Specific Retention, and thus will no longer flow) would be approximately 500 feet from the edge of the impoundment. A more reasonable and representative scenario will have 15% of the soil pore space available, and soil depth remaining the same, the radius of migration from the unit would reach approximately 200 feet. If the flow is not radial around the unit, but linear, the maximum calculated distance it could migrate down-gradient would be approximately 1,200 yards and a minimum of 400 yards from the unit. That distance would be shorter if the effects of tortuosity and dispersivity are included. The liquids would remain locked in the pore space unable to flow and would eventually evaporate. In addition, the sandstone bedrock is several hundred feet thick and serves as an aquitard to the much deeper aquifer (ground water is greater than 200 feet below the ground surface), as such there is virtually no possibility that, if liquids did migrate from the unit that ground water would be impacted.

Conclusion

Based upon the above information and discussion, it is virtually impossible that any free liquid from the impoundment would ever reach the Santa Clara River, the Ivins Reservoir, and the Virgin River or ground water.

In regard to any liquids from the unit being able to reach the Ivins Reservoir, the discharge point of the surface drainage from the Hecla site is above the old Shem Dam, where there is a headgate and diversion into a pipeline that, at one time, discharged into the Ivins Reservoir. However, upon inspection of the dam and headgate, it was apparent that it had not been operational for a very long time, see picture 44 and 45. Telephone conversations with a representative from the Washington County Water Conservancy District, and the State Director of Dam Safety for the State Engineer's Office in Salt Lake City indicated that the Shem Dam and pipeline has not been used to divert water to the Ivins Reservoir since water began being diverted from the Gunlock Reservoir. No one knew for sure when it fell into disrepair and became inoperable, but their best estimate was sometime shortly after 1970 when Gunlock came on-line. Also, inspection of the pipeline during the field reconnaissance indicated that the old pipeline is now discharging a small amount of water that does manage to enter the headgate back into the river about a half mile downstream of the dam, see picture 46. Therefore, there is absolutely no possibility of any water from the Santa Clara River being diverted into the Ivins Reservoir via the old diversion. Thus, nothing from the unit could ever enter the Ivins Reservoir.

≋USGS

Geography *The National Map*

Randall Breeden-EPA: Hecla Drainage Basin

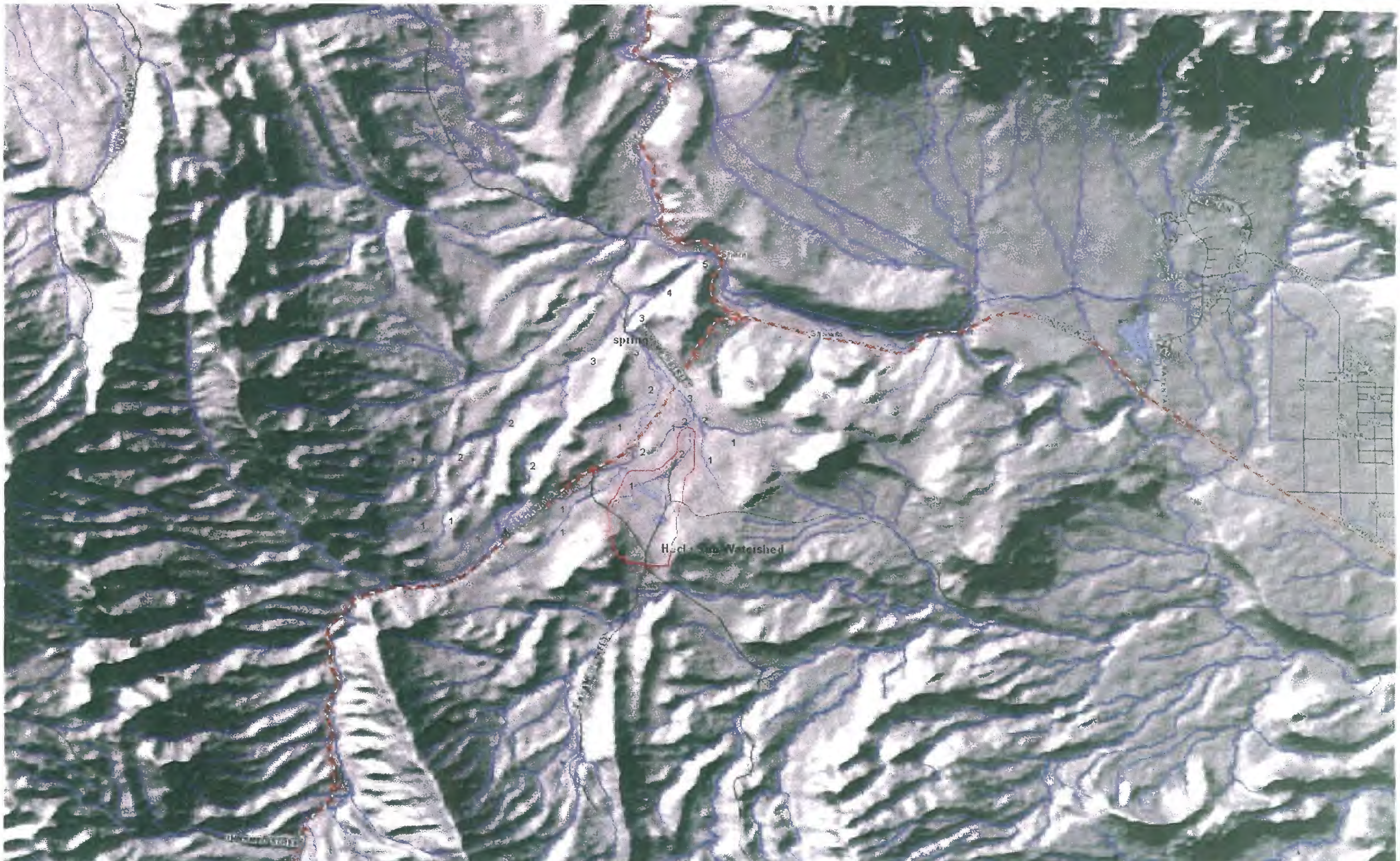
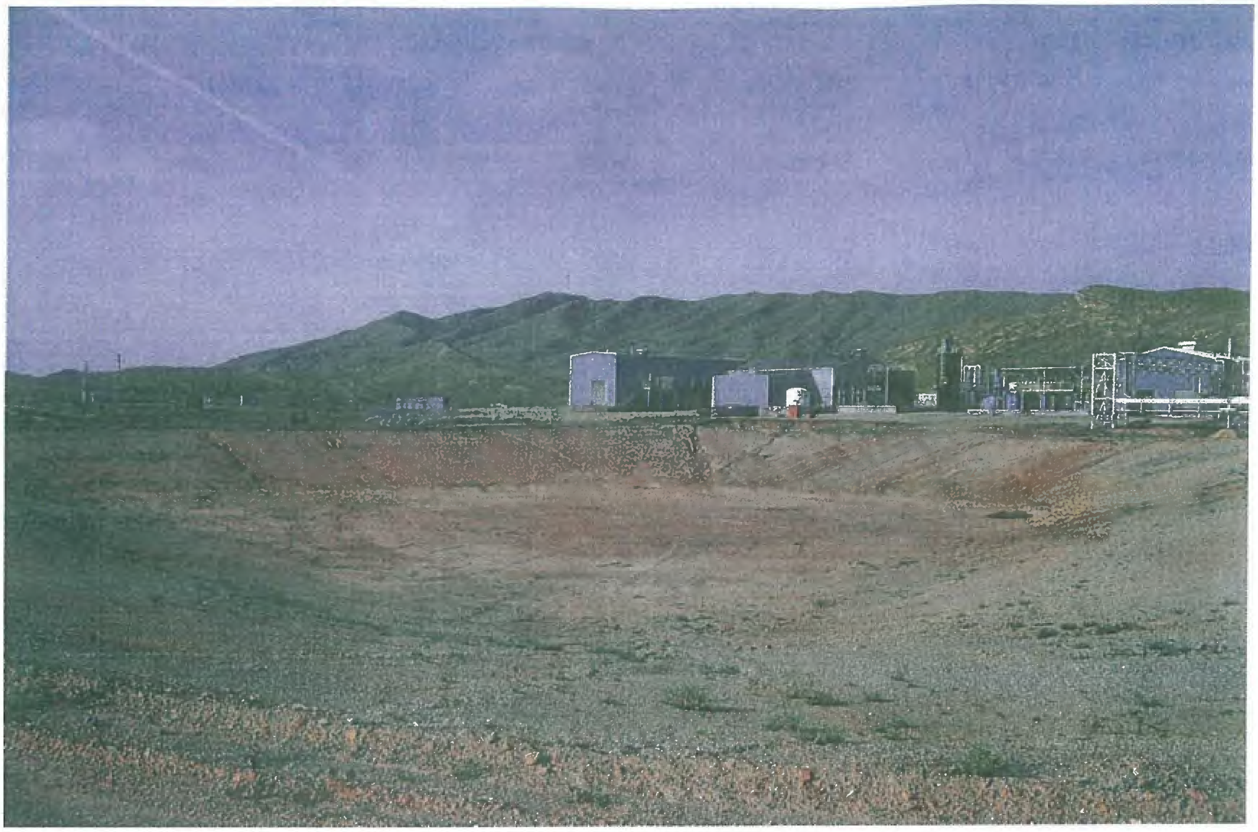


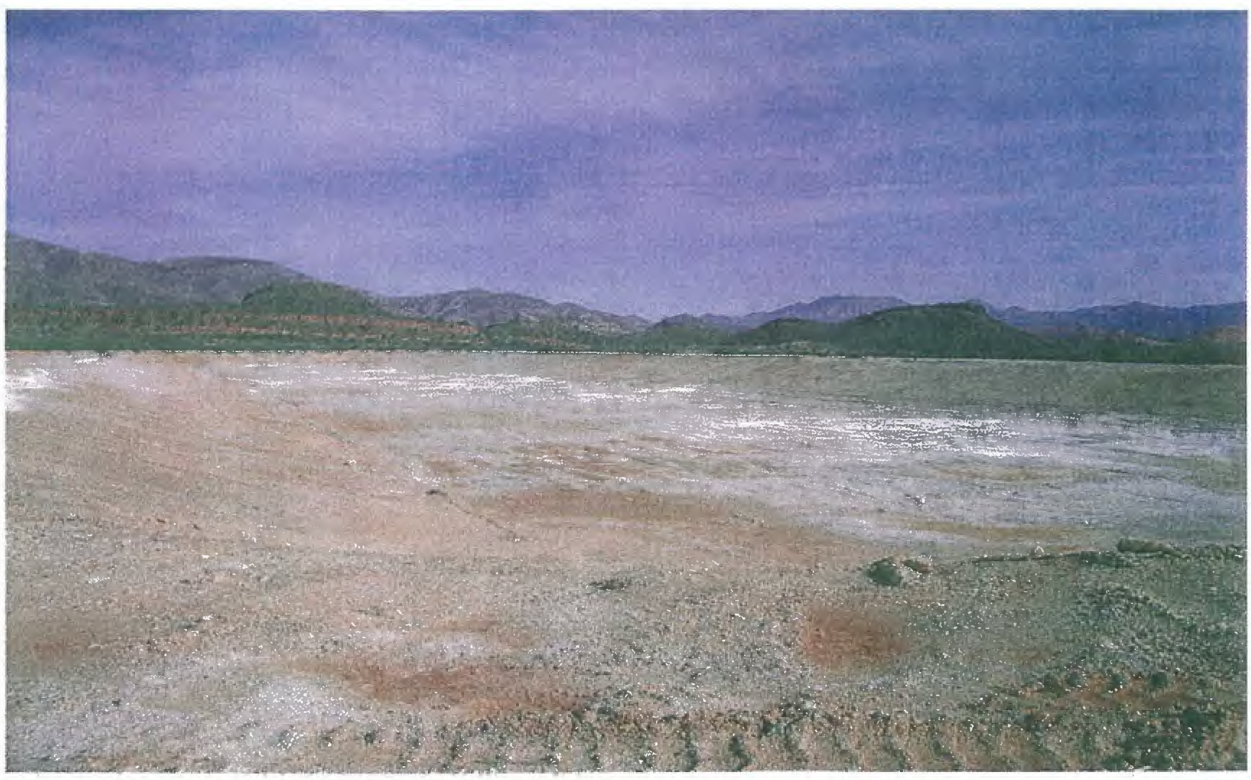
Figure 1. Hecla Sub-Watershed and other Watersheds Near the Site



Picture 1. OMG Closed Evaporation Pond

Picture 2. OMG Closed Evaporation Pond

Picture 3. OMG Closed Evaporation Pond



Picture 4. OMG Closed Evaporation Pond

Picture 5. Aerial View of the Four Evaporation Ponds

Picture 6. Evaportion Pond

Picture 7. Evaporation Pond

Picture 8. Evaporation Pond

Picture 9. Collection and Evaporation Pond for the Southwest Seep Area

Picture 10. Temporary Run-On, Run-Off HDPE Liner

Picture 11. Temporary Run-On, Run-Off HDPE Liner

Picture 12. Warning Sign On the Gate

Picture 13. Fencing and Warning Sign Around Impoundment.

Picture 14. Spring Area, the Lush Vegetated Area is Where the Ground Water Begins to Discharge, Note No Vegetation on Other Side of Road

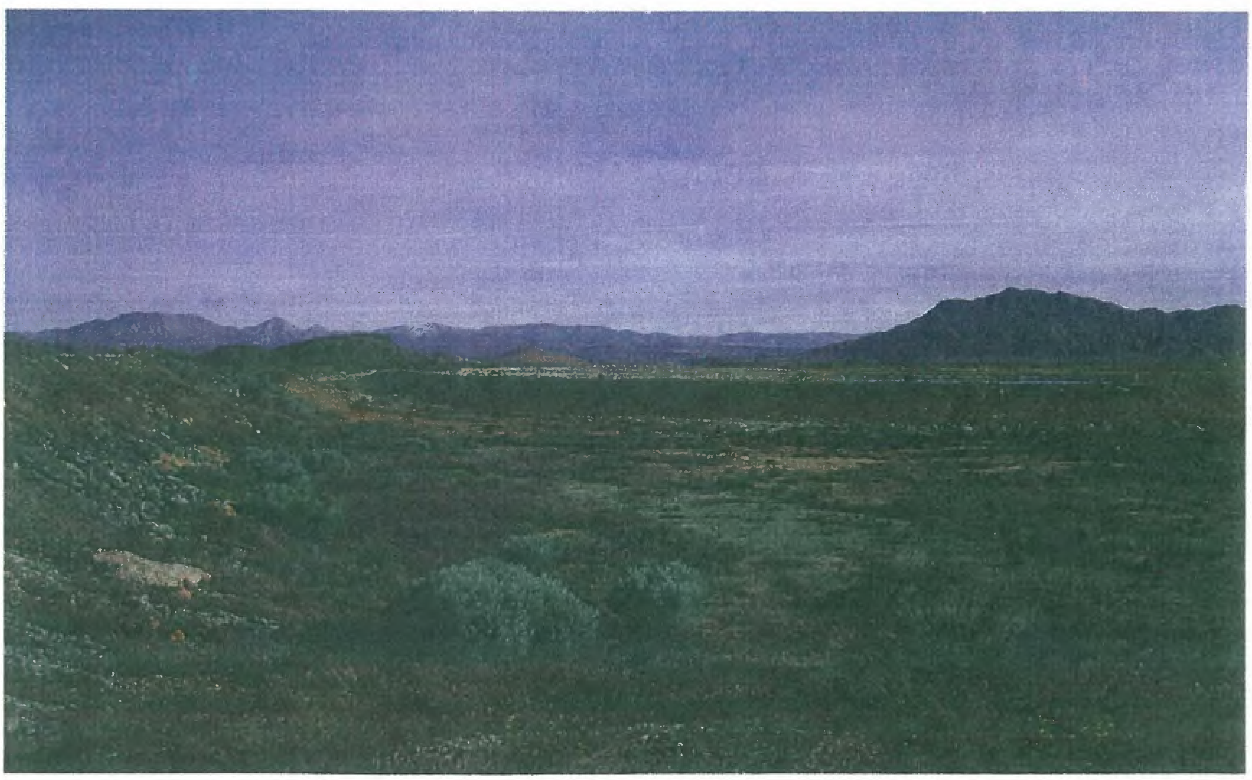
Picture 15. Ground Water Seep Forming the Spring

Picture 16. Riparian Habitat In Spring Area and Along Stream. Note, No Evidence of Flooding or Scouring.

Picture 17. Surface Flow From Spring Area in 3^{rd} Order Reach After 90° Turn Toward the Santa Clara River.

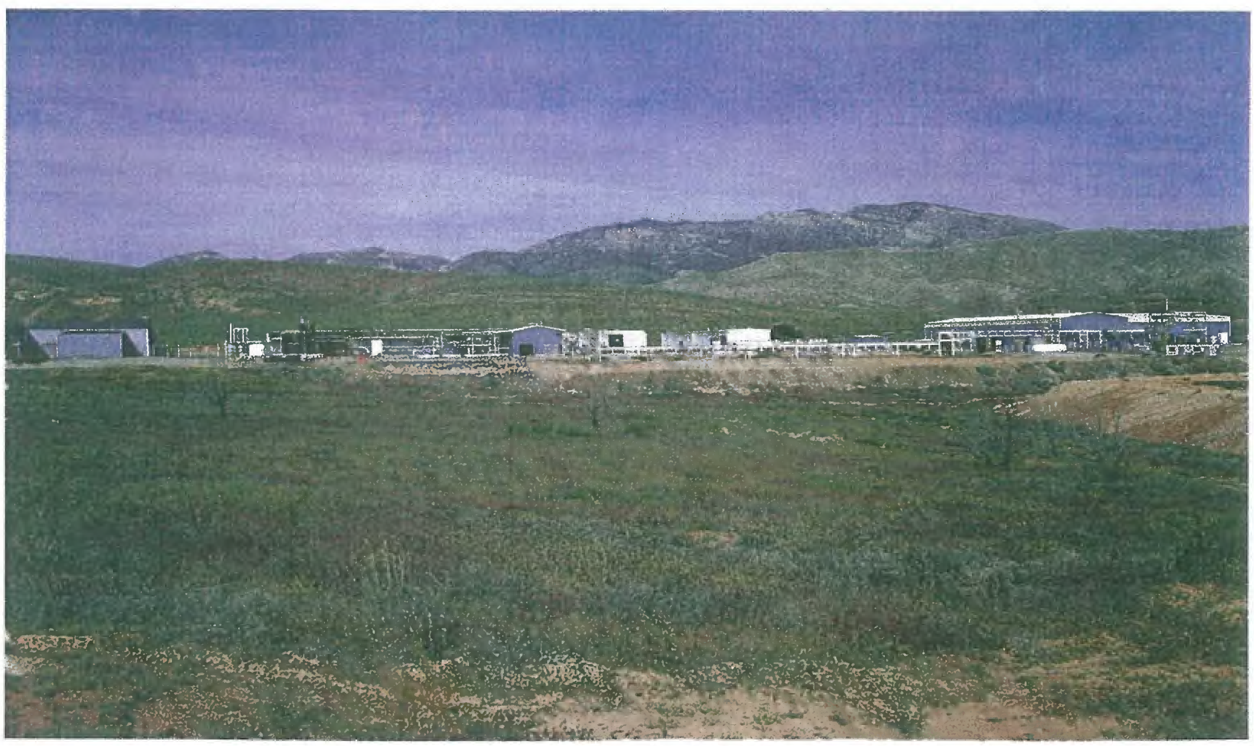
Picture 18. Looking at the Headwaters of the Drainage Near the Plant Site

Picture 19. Drainage Toward the Unit from Picture 18.



Picture 20. Looking Northeast at the Unit, Drainage Around the Unit from the West.

Picture 21. Drainage Around Unit, Interceptor Berm (Run-On Control) from Road Construction Within the Sub-Watershed.



Picture 22. Drainage Around the Unit Looking West at the Plant.

Picture 23. Incised Channel Around the Unit.

Picture 24. Run-On Drainage Channel Around the Unit Heading Off-Site.

Picture 25. The 4 Million Gallon Retention Pond

Picture 26. Drainage Patterns into the Retention Pond, the Unit is in the Upper Right Corner.

Picture 27. Drainage Toward the Cow Pond (where the trees are in the middle).

Picture 28. The Cow Pond. (it's full of cat-tails, some standing water).

Picture 29. Cow Pond, Looking back at the Facility. (note, full of cat-tails).

Picture 30. Drainage Exiting the Cow Pond, (major part of 2nd order reach watershed).

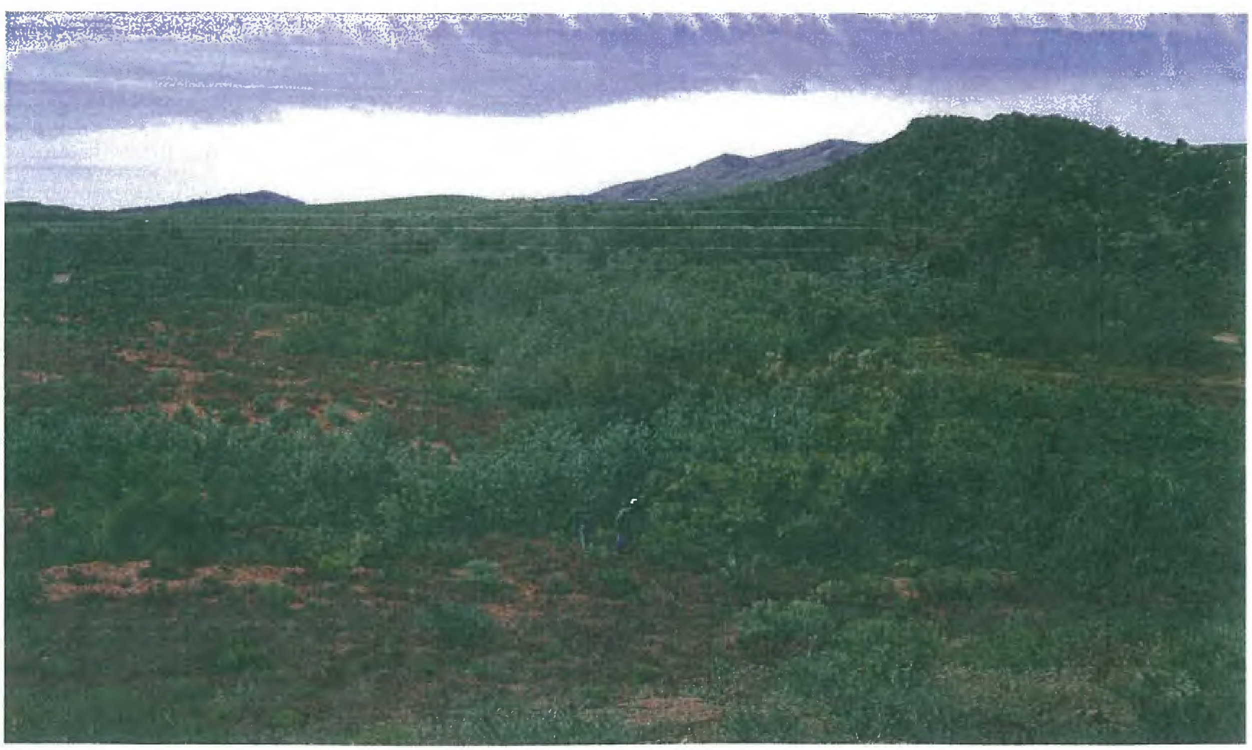
Picture 31. Streambed of 2nd Order

Picture 32. Streambed of 2nd Order Reach Before Intersection with the Other 2nd Order Reach, Prior to Crossing Old Highway 91.

Picture 33. Confluence of the Two 2nd Order Reaches South of Old Highway 91. Drainage from the Site is to the Right of the Tree in the Streambed. The reach on the left has much greater flow than the one coming from the site.

Picture 34. Culvert Going Under Old Highway 91.

Picture 35. The 3rd Order Reach Where it Crosses the Dirt Road Approximately 0.3 Miles Upstream From the Spring.



Picture 36. Spring Area, (shot from the geologic structure that forces ground water to the surface). Note the Heavy Riparian Vegetation Compared to Immediately Upstream.

Picture 37. Emergence of Ground Water, Beginning of the Spring.

Picture 38. Downstream from the Spring.

Picture 39. The 3rd Order Reach (now flowing over sandstone) Upstream of Confluence with the Other 3rd Order Reach.

Picture 40. Rougher Terrain of the 3rd Order Reach Before Confluence.

Picture 41. Looking Down at the Santa Clara River. Confluence is at the Base of the Slopes.

Picture 42. Confluence with Other 3rd Order Stream (right Channel, the heavily wooded area in the left hand side of the picture is where the drainge from the site enters, it's the smaller of the two.

Picture 43. Confluence of 3rd Order Streams, (note the scouring from the flooding).

Picture 44. Shem Dam and Headgate, (note disrepair)

Picture 45. Diversion Headgate (where it normally enter the pipeline, however there are not gates).

Picture 46. Pipeline from Shem Dam Discharging into the Santa Clara River.